

## **REMARKS**

In response to the above-identified Final Office Action, Applicant seeks reconsideration thereof. In this response, Claims 1-3 and 11 have been amended, no claims have been cancelled and no claims have been added. Accordingly, claims 1-20 are pending.

### **I. Examiner Interview**

Applicant respectfully submits the following Interview Summary of the Examiner interview conducted on August 30, 2005 via telephone between Examiner Natalia Levkovich and Applicant's Attorney Stacie J. Sundquist. During the interview the claim rejections under 35 U.S.C. §§ 112, 102 and 103 in the outstanding Final Action were discussed. In particular, amendments were proposed to overcome the rejection of Claims 1-3 under 35 U.S.C. §112. In addition, in regard to the rejections under 35 U.S.C. §§ 102 and 103 Applicant pointed out to the Examiner the believed distinctions between the claims of the instant application and the cited references and proposed amendments to further clarify such distinctions. No agreement was reached during the interview.

### **II. Amendments to the Claims**

Applicant respectfully submits herewith amendments to Claims 1 and 11 deleting the language "is forced to" from the claims to clarify that the recited "external pump" is an element of the claimed invention. Claims 1-3 are further amended in order to overcome the Examiner's rejection under 35 U.S.C. §112, second paragraph discussed more fully below. Applicant respectfully submits support for the amendments to Claim 1 may be found, for example, on Page 7, lines 11-13, Page 8, lines 4-7, Page 9, lines 1-7 of the specification. Support for the amendment to Claim 2 may be found, for example on page 9, lines 8-10 of the specification. Support for the amendment to Claim 3 may be found, for example, on page 9, lines 8-10 of the specification. Applicant respectfully requests the Examiner's consideration and entry of the attached amendments to Claims 1-3 and 11.

### **III. Claims Rejections Under 35 U.S.C. §112**

The Examiner rejects Claims 1-3 under 35 U.S.C. §112, second paragraph as being unclear for failing to particularly point out and distinctly claim the subject matter Applicant regards as the invention. In particular, the Examiner alleges Claim 1 does not set forth the structural cooperation between the sensing substrate and the channel substrate and Claims 2-3 do not recite further structural limitations to the device of Claim 1. Applicant respectfully submits herewith amendments to Claims 1-3 wherein Claim 1 is amended to clarify that the sensing substrate and the channel are bound at the channel and chamber to prevent leakage of the injected fluid. Claims 2-3 are amended to recite further limitations to the device of Claim 1. In view of the foregoing, Applicant respectfully submits, Claims 1-3 are in compliance with 35 U.S.C. §112 and respectfully requests withdrawal of the rejection to these claims.

### **IV. Claims Rejected Under 35 U.S.C. §102(b)**

The Examiner rejects Claims 1-4 under 35 U.S.C. 102(b) as being anticipated by PG PUB 2004/0007275 issued to Hui Liu et. al. ("Hui"). Applicant respectfully traverses the rejection for at least the following reasons.

The instant invention is directed to a microfluidic device manufactured by binding a sensing substrate including a sensing electrode, an electrode interconnect, and a electrode pad, with a channel substrate including at least two fluid inlet ports, a chamber and a channel wherein a first fluid injected via one of the fluid inlet ports flows by natural capillary force, and a second fluid injected via another fluid inlet port flows by an external pump.

To anticipate a claim, the relied upon reference must disclose every limitation of the claim. In regard to Claim 1, Hui fails to teach or suggest at least the elements of the channel substrate including at least two fluid inlet ports and an external pump wherein "a first fluid injected via one of the fluid inlet ports flows by natural capillary force, and a second fluid injected via another fluid inlet port flows by an external pump." In the outstanding Action, the Examiner fails to point out wherein within Hui these elements are expressly recited. Instead, seemingly recognizing the failure of Hui to teach these

elements, the Examiner alleges Hui teaches loading into two channels 110 and 115 “which seems to indicate that two input ports must be necessary.” See Action, page 4. The Examiner notes as to separate inlet ports, it takes at least two inlet ports to load the sample and reagents into two separate chambers. See Action, page 4. In response to Applicant’s previous arguments that the claimed inlet ports are not inherently present in Hui because a single branched inlet port is possible, the Examiner states such a configuration would still comprise separate inlets with respect to each separate chamber. See Action, page 4. Lastly, the Examiner alleges Applicant admitted Hui teaches fluid flow manipulated by gravity, or by pump, or by capillary forces therefore fluid movement by capillary and a pump force encompasses Applicant’s claimed configuration. See Action, page 4.

As an initial matter, Applicant would like to clarify that Applicant did not admit Hui teaches fluid flow manipulated by gravity, pump or capillary forces. Applicant believes the Examiner is referring to page 7 of the response dated May 20, 2005. On page 7 of the response, Applicant merely recites the Examiner’s basis for rejection as follows, “[t]he Examiner further notes Hui teaches fluid flow by gravity, pump or capillary forces.” Applicant respectfully submits this does not qualify as an admission by Applicant but merely a recitation of the Examiner’s position.

The Examiner’s statements fail to establish a teaching by Hui of a channel substrate including at least two fluid inlet ports, a chamber and a channel wherein a first fluid is injected via one of the inlet ports and flows by natural capillary force and a second fluid injected via another fluid inlet port flows by an external pump. Hui merely teaches that the user loads a sample and reagents via pipetting into the PCR chamber and the hybridization buffer storage chamber. See Hui paragraph [0016] cited by the Examiner. Hui does not suggest that the sample and reagents are loaded into separate inlet ports, nor does Hui teach separate inlet ports are present. Thus, in as much as the sample and reagents could be loaded through a single branched inlet port or through some other structure, at least two separate inlet ports are not inherently present in Hui.

Moreover, Claim 1 recites that the first fluid flows by capillary force and the second fluid flows by an external pump. As previously discussed, Hui fails to teach

both a fluid flowing by capillary force and a second fluid flowing by a pump, and thus further fails to teach an external pump as recited in Claim 1. In fact, Hui teaches an internal pump. Hui teaches that after the user loads the chambers and the PCR reaction is completed, the pump heater is activated and as a result of the localized heating of the pump chamber 105, air in the pump chamber expands acting as a forward pump. See Hui, paragraph [0016]. This pressurized air from the air pump chamber 105 then moves the buffer in chamber 110 into chamber 115 to mix with the PCR product and further to chamber 120 for hybridization. See Hui, paragraph [0016]. Accordingly, Hui not only teaches an internal pump but that the same pump forces the flow of both the sample and reagents. Thus, a first fluid injected flow by natural capillary force and a second fluid flows by an external pump is not necessarily present in Hui.

For at least the foregoing reasons, the Examiner has failed to set forth, and Applicant is unable to discern wherein within Hui at least the elements of a channel substrate including at least two fluid inlet ports wherein a first fluid injected via one of the fluid inlet ports flows by natural capillary force, and a second fluid injected via another fluid inlet port flows by an external pump are taught. Since Hui fails to teach all the elements of Claim 1, anticipation may not be found. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 1 under 35 U.S.C. §102.

Claims 2-4 depend from Claim 1 and incorporate the limitations thereof. Thus, at least for the reasons discussed above in regard to Claim 1, Hui fails to teach or suggest all the elements of Claims 2-4. Since each element of Claims 2-4 is not taught by Hui, anticipation may not be found. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claims 2-4 under 35 U.S.C. §102.

## **V. Claims Rejected Under 35 U.S.C. §103(a)**

**A.** The Examiner rejects Claims 5-9 under 35 U.S.C. 103(a) as being obvious over Hui in view of PG PUB 2002/0150683 issued to Troian et al. ("Troian"). Applicant respectfully traverses this rejection for at least the following reasons.

To render a claim obvious, the relied upon references must teach or suggest every limitation of the claim such that the invention as a whole would have been obvious at the time the invention was made to one skilled in the art. Claims 5-9 depend from Claim 1 and incorporate the limitations thereof. Thus, for at least the reasons discussed above in regard to Claim 1, Hui fails to teach or suggest a microfluidic device having a channel substrate including at least two fluid inlet ports wherein a first fluid injected via one of the fluid inlet ports flows by natural capillary force, and a second fluid injected via another fluid inlet port flows by an external pump. The Examiner has not pointed to, and Applicant is unable to discern any portion of Troian teaching these elements. Since the relied upon references fail to teach or suggest all the elements of Claims 5-9, a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claims 5-9 under 35 U.S.C. §103.

**B.** The Examiner rejects Claims 10-14 and 20 under 35 U.S.C. 103(a) as being obvious over Hui in view of PG PUB 2003/0190608 issued to Blackburn et al. ("Blackburn"). Applicants respectfully traverse this rejection for at least the following reasons.

In regard to Claim 10, Claim 10 depends from Claim 1 and incorporates the limitations thereof. Thus, for at least the reasons discussed above in regard to Claim 1, Hui fails to teach or suggest a microfluidic device having a channel substrate including at least two fluid inlet ports wherein a first fluid injected via one of the fluid inlet ports flows by natural capillary force, and a second fluid injected via another fluid inlet port flows by an external pump. The Examiner has not pointed to, and Applicant is unable to discern any portion of Blackburn teaching these elements. Since the relied upon references fail to teach or suggest all the elements of Claim 10, a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 10 under 35 U.S.C. §103.

Independent Claim 11, similar to Claim 1, is directed to a microfluidic device having a channel substrate including at least two fluid inlet ports wherein a first fluid injected via one of the fluid inlet ports flows by natural capillary force, and a second

fluid injected via another fluid inlet port flows by an external pump. Thus, at least for the reasons discussed above in regard to Claim 1, Hui fails to teach or suggest a microfluidic device having a channel substrate including at least two fluid inlet ports wherein a first fluid injected via one of the fluid inlet ports flows by natural capillary force, and a second fluid injected via another fluid inlet port flows by an external pump. The Examiner has not pointed to, and Applicant is unable to discern any portion of Blackburn teaching these elements. Since the relied upon references fail to teach or suggest all the elements of Claim 11, a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 11 under 35 U.S.C. §103.

In regard to Claims 12-14 and 20, these claims depend from Claim 11 and incorporate the limitations thereof. Thus, for at least the reasons discussed above in regard to Claim 11, neither Hui nor Blackburn teach or suggest a microfluidic device having a channel substrate including at least two fluid inlet ports wherein a first fluid injected via one of the fluid inlet ports flows by natural capillary force, and a second fluid injected via another fluid inlet port flows by an external pump. Since the relied upon references fail to teach or suggest all the elements of Claims 12-14 and 20, a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claims 12-14 and 20 under 35 U.S.C. §103.

C. The Examiner rejects Claims 15-19 under 35 U.S.C. 103(a) as being obvious over Hui in view of Blackburn and further in view of Troian. Applicants respectfully traverse this rejection for at least the following reasons.

Claims 15-17 and 19 depend from Claim 11 and Claim 18 depends from Claim 1 and incorporate the limitations thereof. Thus, for at least the reasons discussed above in regard to Claims 1 and 11, neither Hui, Blackburn nor Troian teach or suggest a microfluidic device having a channel substrate including at least two fluid inlet ports wherein a first fluid injected via one of the fluid inlet ports flows by natural capillary force, and a second fluid injected via another fluid inlet port flows by an external pump. Since the relied upon references fail to teach or suggest all the elements of Claims 15-19,

a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claims 15-19 under 35 U.S.C. §103.

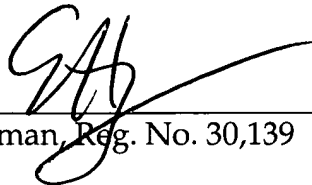
### CONCLUSION

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800.

Respectfully submitted,

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